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SIMULATION AND ANALYSIS OF WIRELESS DEVICE TRACKER USING PROTEUS

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Abstract - *The widespread use of mobile phones in contemporary life has created both benefits and difficulties. Due to worries about security, privacy, and adherence to nophone zones, mobile phone detection has taken on a substantial amount of significance. This paper offers a thorough analysis of mobile phone detection methods and the many uses for them. The main emphasis is on methods, including RF signal analysis, network-based detection, device fingerprinting, and machine learning-based approaches. The paper also analyses developing technologies, their benefits, drawbacks, and probable prospects for mobile phone detection in the future. Addressing security and privacy problems in a variety of settings, from workplaces and educational institutions to high-security facilities, requires an understanding of and advancement in mobile phone detection technologies.*

Key Words: **RF signal, Communication potential, Resistor, IC LM358, BC548.**

1.INTRODUCTION

The usage of mobile phones has become pervasive today, making the necessity for efficient mobile phone detection systems critical. Despite their enormous convenience and communication potential [1]. Mobile phones can pose severe security risks or cause disruptions in places where their use is restricted. By detecting the use or existence of mobile phones inside a certain location, mobile phone detectors act as a vital tool in reducing these worries. A device that makes use of wireless signals, for instance WiFi, Bluetooth, or GPS, to monitor and locate other gadgets is referred to as a wireless device tracker. It helps improve asset management, security, and device optimization through the continuous monitoring of mobile phones, tablets, and Internet of Things devices. By offering insights into device mobility and usage trends, these trackers improve efficiency across a range of industries, including logistics, healthcare, and retail. They also provide exact location data.

Mobile devices are identified and located by mobile phone detectors using a variety of technological methods. These methods include machine learning-based techniques, network-based detection, device fingerprinting, and radio frequency (RF) signal analysis [2]. The goal is to reliably identify radio frequency signals from mobile phones and separate them from other signals to ensure adherence to no-phone zones or security. To avoid covering the entire target region, the detection circuit was installed in the research on a constant specified area. Second, the mobile robot unit was operated without the usage of any software due to the Bluetooth module [3]. Given the constraints, this study will address and present ideas to improve the performance of the mobile robot that detects cell phones in making use of a mobile robot's customized cell phone detection circuit and the detector sending a signal to trigger an alarm and then allowing the primary computer user to temporarily disable any unwanted cell phone connections by executing the jammer Yt_003 [4]. Using a camera mounted in front of a mobile robot to wirelessly transmit a video monitoring signal to the main computer. Developing a graphical user interface (GUI) control panel using a customized HTML script that allows the user to navigate and control the mobile robot in the target zones while turning on and off the jammer [5].

2. LITERATURE REVIEW

A system that controlled the presence of GSM signals from an illegal user in prohibited zones was devised by Dar et al. in 2014 [6]. Another device could be activated by that system to prevent consumers from using services. Additionally, the device provides GSM frequency signal jamming upon detection to stop any unwanted connections. Nyamawe and Mtonyole introduced another cell phone detection circuit, this time utilizing an Arduino microcontroller [7]. Instead of personally inspecting students upon entry, the Arduino detecting circuit is utilized to replace the current methods of ensuring that they do not have their phones in their pockets during tests. Following these earlier

research studies, Deshpande and Jadhav proposed a study in 2015 [8]. They proposed an intelligent mobile phone detection project in their research to stop any active, illicit mobile (GSM) connections. Private meetings, exam rooms, defense facilities, military camps, and hospitals might all benefit from this idea. In the next year, 2016, three research papers were considered. The first was suggested by Kumar, who utilized a cell phone to control a mobile robot remotely [9]. Three steps of technology were employed to control the used robot: perception, processing, and action (actuators). Typically, the preceptors were built-in sensors, microcontrollers handled processing, and motors carried out the work. The second inquiry, which used an RF signals detection circuit, was presented in. Gayathri and Sivasakthi used this framework to avoid incoming and outgoing calls from mobile phones while simultaneously monitoring audio and video transmission signals from cameras and microphones. The RF signals detector was doing its job by sounding an alarm beep [10]. Ambulge et al. proposed a wireless motion of mobile robot employing Bluetooth module to control robot's motions via a cell phone in the most recent year, 2017. This cell phone contains an Android-based app and a Bluetooth signal for wirelessly directing the motion of the mobile robot [11]. Parvateesam and Kumar presented a different study in the same year. There are two basic things that could be said about the limitations that the earlier studies may have [12].

3. DESIGN AND SIMULATION

Proteus software is utilized for designing this circuit. The circuit's semiconductor serves as its core. The LM358 is a DC gain block and transducer amplifier. Its power supply covers a range of 3V to 32V. Transistor BC548 is linked to this semiconductor. It is an NPN bipolar junction transistor that is employed for switching and amplification. There is an 800 DC current gain maximum. The antenna connected C1,1uF is used to block the DC voltage that is delivered to the antenna. An additional 1uF capacitor, C2, is linked to the semiconductor and serves the purpose of eliminating high-frequency noise generated by high-speed circuit drive. To isolate it from noise that might hinder other circuits and its own performance, the C3, 1uF, is connected to ground. This circuit uses interconnected multiple resistors, LEDs, batteries, and switches.

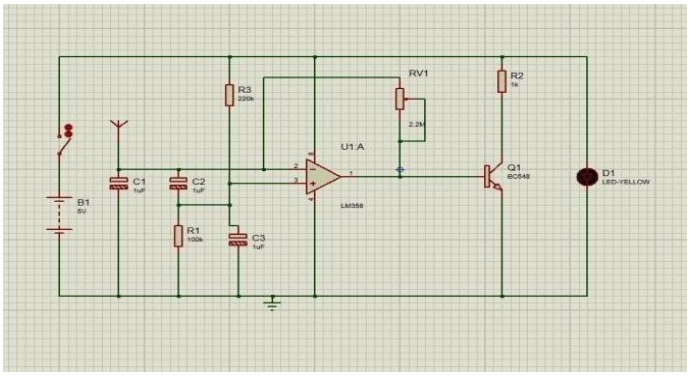

Fig -1: Simulation on mobile phone detector

Table -1: Simulation Parameters

Sl.no	Components	Specifications
1	Semiconductors	IC- LM358 op-amp
2	Transistors	BC548(npn)
3	LED	5mm
4	Resistors	R1- 100 Kilo-0hm R2- 1 Kilo-ohm R3- 220 Kilo-ohm VR1- 2.2 mega-ohm
5	Capacitors	C1, C2- 1µF C3-1µF
6	Miscellaneous	Battery- 5V, Switch, Antenna

4.RESULT ANALYSIS

There are two stages in this circuit. The amplification stage comes upon completion of the electromagnetic pickup stage. the op-amp-based circuit comprising a couple of active passive components. The op-amp functions as a detector of frequencies. A lower power dual operational amplifier (ICLM358) with a suitable bias has been inserted. To alter the circuit's sensitivity or range, utilize the potentiometer RV1. LEDs are coupled to the emitter pin and the operational amplifier's output is connected to the Q1 transistor's base signal. A mobile phone's presence is demonstrated by a led when it is in use. The LED is connected to the output of the LM358 through a transistor, which is turned on to trigger the LED to flash.

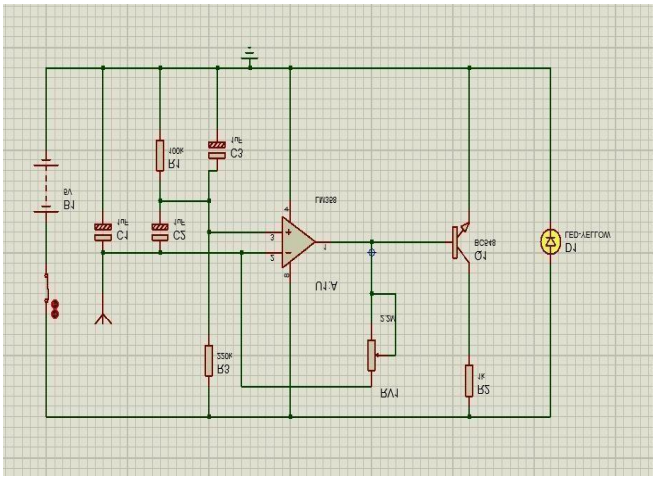

Fig -2: Result on mobile phone detector

If the mobile phone detector was accurate in determining if there were mobile phone signals present or not in the controlled environment. The percentage of "true positives," which shows how well the detector can distinguish between mobile phone signals. The percentage of "true negatives," which shows how well the detector can detect the absence of mobile phone signals. The amount of time it took the detector in the simulated environment to find and classify mobile phone signals. Insights into the RF signals, network traffic, and other data used for detection are provided by a detailed examination of these features and variations. These findings would give a thorough understanding of the performance of the mobile phone detector, allowing for further development, optimization, and perhaps even the deployment of the detection system in the actual world. To ensure that the detector effectively fulfils its intended purpose, it is important to attain a high level of accuracy while avoiding false positives and false negatives.

5.CONCLUSION

Wireless device trackers are used to monitor active devices in restricted areas overall. This gadget enhances asset management, efficiency, and security in businesses and institutions. This device helps find lost or stolen products and is used for tracking equipment, minimizing loss, and identifying misplaced devices. As a result, the concept was successfully executed and simulated.

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